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CABLE VIBRAGUARD

RELATION TO COPENDING PATENT APPLICATION

[0001] This patent application is a continuation-in-part of U.S. patent application Ser. No. 10/105,899, filed March 25, 2002, allowed on August 22, 2003.

FIELD OF THE INVENTION

[0002] This invention relates to a cable guard for a compound bow. More specifically, a cable guard that reduces noise generated by the vibration of the cables, and at the same time, helps increase the speed of the arrow.

BACKGROUND OF THE INVENTION

[0003] In the sport of archery, the basic configuration and operation of compound bows are generally known as they have been in use for a long time. Compound bows are used a great deal in hunting because they provide several advantages over the simpler non-compound varieties.

[0004] Compound archery bows include tension cables and a bowstring that are connected between upper and lower bow limbs. It is customary to dispose the bowstring and the tension cables relatively close together, proximate the vertical centerline of the bow, in order to minimize any twisting torque on the bow limbs.

[0005] A notable advantage of compound bows is that a reduction in draw weight is realized, allowing the archer to hold full draw at a draw weight less than that of the required maximum.

[0006] Compound bows also achieve more gradual arrow acceleration upon release with reduced stress on the arrow

and the archer, resulting in increased arrow speed and shooting accuracy.

[0007] A problem presented by compound bows is that noise is generated upon releasing the bowstring to propel the arrow. When the bowstring reaches the end of its arrow-propelling path, the cables (which cross in the center portion of the bow), rub against each other. This rubbing causes frictional forces that may produce cable wear and create noise which may alert game birds and animals.

[0008] A popular solution to this problem is to provide compound bows with a cable guard having a rod mount that can provide a selectable degree of displacement of the tension cable from the plane of the path of the bowstring, by rotation of the mount. The rod mount is generally threaded directly into the bow handle area, either above or below the handgrip.

[0009] The prior art shows that numerous attempts have been made to maintain the lateral spacing of the cables while reducing the friction between the cables.

[0010] United States Patent No. 4,452,222 entitled "Cable Guard for a Compound Bow" to Quartino et al. discloses a cable guard that comprises a rod that extends from the bow handle and beyond the cables when the bow is in a fully drawn position. The rod is positioned laterally from the bowstring to avoid any interference with the bowstring. A cable-retaining member is rotatably and slidably mounted on the rod. The cable-retaining member includes two bores that are perpendicular to the rod for slidably receiving the cables to hold them in a lateral spaced relationship with the bowstring.

[0011] United States Patent No. 4,596,228 entitled "Cable Separator for Compound Bows" to Smith discloses a

rod attached to the handle portion of the bow that extends rearwardly beyond the bowstring. Positioned about the external surface of the rod is a cable guard assembly which positions a cable on either side of the bow. The purpose of the invention is to prevent an interfering contact of the cable strands with an arrow during impelling flight of the arrow from the bow, thereby obviating impairment of the true flight of the arrow released from the bow.

[0012] United States Patent No. 5,718,213, entitled "Swing Arm Cable Guard" to Gallops Jr. et al., discloses a cable guard, including a support member and a swing arm pivotally connected thereto. A cable retaining means having two bores therein for retaining the cables is pivotally mounted on the swing arm. The angle between the support member and the swing arm is such that when the bow is drawn, the distance between the cables, which is contained in the cable retaining means, and the plane of the bowstring travel, is less than the distance between the cables and the plane of bowstring travel when the bow is at rest. Because the cables are closer to the plane of bowstring travel when the bow is drawn, the cables and bow limbs are less stressed when the bow is drawn. The cable guard retaining means may not be adjusted to change the distance between the cable guard retaining means and bowstring.

[0013] In the prior art for cable guards of the type described above, the rod on which the retaining members were slidably mounted was required to be of sufficient length to permit the retaining members to be mounted thereon when the bow was in the drawn condition.

[0014] Unfortunately, the rod length can be a potential distraction to the archer when the arrow is being shot.

Another problem presented by the rod of the prior art is that most archers do not remove the cable guard from their bow for transport, and because many forms of transportation require bows to be cased for transport, the use of such cable guards requires substantial storage area and larger bow cases.

[0015] Further, the rod and sliding retainer introduces additional friction into the system, for example, the increased friction force between the cables and the sliding retainer and between the sliding retainer and the support rod as the bowstring is moved from brace position to full draw.

[0016] Some of these disadvantages appear to have been overcome by the cable guard disclosed in United States Patent No. 4,834,061 entitled "Cable Vibraguard" to the present inventor, in which a support member has a swing arm pivotally attached thereto. A cable retaining member having two openings therein is located at the free end of the swing arm. The cables pass through and are contained within the openings of the retaining member. When the bow is drawn, the cables travel in a plane parallel to the general direction of the bowstring and cause the retaining member and connected swing arm to be pivoted away from the support member and the bow handle. The present invention is an improvement of the cable guard disclosed in this patent.

[0017] The present invention concerns another means for reducing the frictional forces between the cables and the bores of the retaining means.

[0018] Another problem presented by a conventional compound bow is that a considerable amount of energy stored in bow limb is wasted by propelling the bow limb forward when the drawn bowstring is released. Instead, it is

desirable to use at least a portion of this wasted energy to propel an arrow.

[0019] The arrow speed depends upon several factors, one of the most important being the amount of energy put into the bow. Generally speaking, the more total energy put into the bow, the faster that the arrow will be propelled. Increased arrow speed is desirable, especially when hunting and shooting heavy arrows.

[0020] Another problem presented by a conventional compound bow is that the crossing cables are located in the point of view of the archer, thus diminishing the visibility of the archer.

[0021] Thus, the present inventor feels the necessity of providing a cable guard for a compound bow that is simple, quiet, inexpensive, and less susceptible to wear and tear, increases the visibility for the archer, and, at the same time, increases the arrow speed.

SUMMARY OF THE INVENTION

[0022] Therefore, it is an object of this invention to provide a cable guard that separates the cable positioned between the bowstring and the handle portion of a compound bow.

[0023] It is yet another object of the present invention to provide a cable guard that decreases the noise generated during use as to not alert or frighten game birds and animals.

[0024] It is yet another object of the present invention to provide a cable guard in which the frictional forces generated between the cables and the cable retaining members are reduced when the bow is drawn.

[0025] It is yet another object of the present invention to provide a cable guard which does not extend beyond the cables positioned between the bowstring and the handle portion of the compound bow when the bow is in a "relaxed" position.

[0026] It is yet another object of the present invention to provide cable guard with reduced hand shock and vibration in order to avoid arm fatigue.

[0027] It is yet another object of the present invention to provide a cable guard which is economical to produce and maintain.

[0028] It is yet another object of the present invention to provide a cable guard that separates the cable positioned between the bowstring and the handle portion of a compound bow increasing the visibility of the archer.

[0029] It is yet another object of the present invention to provide a cable guard that helps increase the speed of the arrow.

[0030] In view of the foregoing disadvantages inherent in the known types of cable guard systems in the prior art, the present inventor discovered a unique cable guard for use with a compound bow, the compound bow having a handle portion and a pair of opposite bow limbs, a first and a second cable which cross one another in extending between opposite bow limbs and a bowstring, the cable guard comprising:

a rod having a first end and a second end, wherein the first end of the rod is attached to the handle portion of the compound bow;

a housing disposed at the second end of the rod;

at least one swing arm extending outwardly from the housing, the swing arm connected about a point near one end of the housing via a pivoting means;

a biasing means in the housing; and

wherein when the bowstring is drawn to a draw position, the swing arm pivots, thereby compressing the biasing means.

[0031] The cable guard further can include: mounting means for attaching the first end of the rod to the handle portion of the compound bow and a cable guide means positioned at the first end of the swing arm, with the cable guide means adapted to slidably receive and separate the first and second cable.

[0032] When the bowstring is drawn to a draw position, the cables move in the direction of the bowstring urging the swing arm in the direction of the bowstring. The movement of the swing arm urges a piston in the direction of the handle, thereby compressing the biasing means inside the housing.

[0033] When the bowstring is released, the biasing means returns to its relaxed (uncompressed) position and the first and second cables are compelled to stop vibrating by the movement of the biasing means returning to the original position, thereby decreasing the amount of vibration noise produced by the vibrating of the first and the second cable. In addition, a bumper may optionally be attached to the cable guard that may come into contact with the bow strings after the arrow has been shot. The bumper may, at least partially, function to cause the strings to stop vibrating through this contact.

[0034] The compression of the biasing means adds an extra tension force, wherein the extra tension force provides the arrow with an increased speed.

[0035] In a first preferred embodiment, the biasing means comprises more than one spring.

[0036] The above referenced pivoting means (whereby a rotational motion of the swing arm is utilized to compress the biasing means) can be accomplished in numerous ways, including wherein the pivoting means comprises a pin and a cam. In an alternate embodiment, the pivoting means may include a pin such that the end of a swing arm only slidably interacts with the piston to compress the biasing means.

[0037] The foregoing has outlined rather broadly the more pertinent and important features of the present invention in order that the detailed description of the invention that follows may be better understood, and the present contribution to the art can be more fully appreciated. Additional features of the invention will be described hereinafter, which form the subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and the specific embodiments disclosed may be readily utilized as a basis for modifying other security systems for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent structures do not depart from the spirit and scope of the invention as set forth in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] For a fuller understanding of the nature and objects of the invention, reference should be made to the

following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a side view illustrating the cable guard of the present invention attached to a compound bow in a rest position;

FIG. 2 is a side view illustrating the cable guard of the present invention attached to a compound bow in a drawn position;

FIG. 3 is a partial exploded section taken along line A-A^1 on FIG. 1 of an embodiment of the present invention;

FIG. 4 is a partial section view of FIG. 3;

FIG. 5a is a partial section of an embodiment of the present invention;

FIG. 5b is a partial section of an embodiment of the present invention; and

FIG. 6 is a partial section view illustrating a preferred embodiment of the present invention in a relaxed, intermediate and compressed state.

[0039] Similar reference characters refer to similar parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE INVENTION

[0040] FIG. 1 is a side view illustrating the cable guard **10** of the present invention attached to a compound

bow in a rest position. The cable guard **10** is used with a conventional compound bow **20** having a bow handle **30** and a pair of bow limbs **40, 50**. The first bow limb **40** and the second bow limb **50** are oppositely positioned in bow handle **30**. Bowstring **60** spans between a first bow tip **70** and a second bow tip **80**. The bowstring **60** then continues and extends over the pulleys **90A, 90B** positioned at or proximate to each of the bow tips **70, 80**, and then the two ends of the bowstring **60**, designated first cable end **100** and second cable end **110**, cross to the opposite limb at which point they are attached to define a compound bow **20**.

[0041] FIG. 2 is a side view illustrating the cable guard of the present invention attached to a compound bow in a drawn position.

[0042] FIG. 3 is a partial section taken along line A-A^1 on FIG. 1 and provides greater detail of an embodiment of the cable guard **10** of the present invention.

[0043] FIG. 4 is a partial section view of FIG. 3.

[0044] FIG. 5a is a partial section view of an alternate embodiment of the present invention. This embodiment utilizes a pin **355** to allow the swing arm **170, 180** to pivot. In this embodiment, the swing arm is slidably connected to piston **325**. When the swing arm **170** is pivoted to a draw position, swing arm **170** pivots about pin **355** thereby causing the biasing means **185** to be compressed (via the piston in this embodiment). Note that the swing arms **170, 180** illustrated in FIG. 5a may be of varying geometry as illustrated for example in FIG. 5b such that the location of pin **355** can be chosen such that the contact area between the swing arm **170, 180** and the piston **325** can be controlled during the pivoting of the swing arms through the draw of the bow.

[0045] FIG. 6 is a partial section view illustrating a preferred embodiment of the present invention in a relaxed, intermediate and compressed state.

Rod

[0046] In its basic embodiment, the rod **130** includes a first end **140** and a second end **150**.

[0047] The mounting means **120** firmly attaches the first end **140** of the rod **130** to the handle portion **30** of the compound bow **20**.

[0048] An attaching means **310** attaches the second end **150** to a housing **160** (although a further embodiment would allow for other attaching means, such as the rod second end **150** having a threaded section such that it could be attached directly to the housing **160**).

Housing

[0049] The housing **160** is disposed at the second end **150** of the rod **130**, the housing **160** having a first end, and a second end.

[0050] At least one swing arm **170**, **180** is pivotably attached to the housing **160** via a pivoting means (such as cam **340** and a cam pin **350** in FIG. 3-4, or via pin **355** as illustrated in FIG. 5). Cam pin **350** is received in housing bore **390**. Each arm includes a first end **200** and a second end **205**. In an alternate preferred embodiment, the cable guard may have only one swing arm **170** or **180**.

[0051] The swing arm may also be pivotably attached to a piston **320** as shown in the embodiment of FIG.3-4. The swing arm may be attached to the piston **320** by a fastening means such as floating pins **360** which may be received in piston bores **330** in the piston **320**.

[0052] The swing arm may also be slidably connected to the piston **320** as shown in FIG. 5.

[0053] A cable guide means **190** may be positioned at the first end **200** of each swing arm **170**, **180**. Each cable retaining means **190** may include openings **210** and **220** therein to retain cables **100** and **110**. The opening **210** may preferably have a depth greater than the depth of the opening **220** in order to prevent the cables from touching or rubbing each other.

[0054] The cable guide means **190** slidably receive and separate the first cable **100** and second cable **110**. Thus, the first and second cable are slidably received and separated during the drawing and release of the bowstring **20**, thereby ensuring that the first cable **100** and second cable **110** do not rub against each other and decreasing the amount of noise produced by the vibrations of the first **100** and second **110** cables immediately after the bowstring **20** has propelled an arrow.

[0055] A cover **370** may be placed over the housing **160**, wherein a respective cover pin **380** is received by a respective housing cover bore **400**, or some other suitable method of attachment.

Biasing Means

[0056] The biasing means **185**, such as a spring, is disposed inside the housing **160**. The biasing means **185** includes a first end **280** and a second end **290**.

[0057] The biasing means **185** is preferably a coil spring having a pre-set force. The coil spring is preferably made of steel, but can be made of any other suitable material.

[0058] The present invention contemplates also the use of any type of spring capable of storing power when compressed, such as an air spring, leaf spring, or other energy storage device as biasing means.

[0059] The biasing means **185** has an outer diameter slightly smaller than the inner diameter of the housing **160**.

[0060] The present invention also contemplates the use of a biasing means **185** comprising more than one spring.

[0061] The length of the biasing means depends on the type of compound bow used and is controlled to provide a "stopped" action of the swing arm; thus, it will not interfere with the discharged bowstring and arrow. Thus, when the biasing means goes back to its normal relaxed position, the biasing means provides the bow with an immediate stopping action that prevents any further movement of the swing arm or the cables.

[0062] Optionally, the present invention contemplates the use of an adjusting rod (not shown) to engage the biasing means and change the pre-set compression force of the biasing means.

[0063] As can be seen from FIG. 1, rest position, the swing arms are substantially located in the same plane. In the drawn position, FIG. 3, the swing arms are diverging rearwardly to a substantially closed position. It will be seen that when bowstring **60** is drawn, cables **100** and **110** move in the direction of the bowstring and both cables retaining means **190** and swing arms **170**, **180** are pivoted to the position shown in FIG. 2.

[0064] When the bowstring is drawn to a draw position, the cables move in the direction of the bowstring urging the swing arms in the direction of the bowstring. The

movement of the swing arms urges the piston in the direction of the handle compressing the biasing means inside the housing.

[0065] The compression of the biasing means adds extra tension force to the biasing means. Thus, upon releasing the bowstring, the arrow is propelled by the pre-loaded tension of the biasing means, the extra tension on the biasing means, and, of course, also by the tension put into the bow by the final draw of the bowstring. The biasing means causes the energy that propels the arrow to be greater than the energy, which is required on the final draw of the bow. This increases the speed of the arrow.

[0066] FIG. 6 illustrates three states of the cable guard; relaxed, intermediate and compressed.

[0067] Thus, the cable guard of the present invention helps to overcome the problem presented by a conventional compound bow regarding the waste of energy produced by propelling the bow limb forward when drawn bowstring is released. Thus, the additional energy allows the user to use a lighter compound bow without sacrificing arrow speed.

[0068] Although only a few exemplary embodiments of this invention have been described in detail above, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the following claims.